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Recent Quarkonium Results from BaBar

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We present recent results on quarkonium states from the Babar experiment. We have observed the $Y(\chi_{c1} D_J)$ state of bottomonium in the reaction $Y(3S) \rightarrow \gamma Y(\chi_{c1} D_J)$, $Y(\chi_{c1} D_J) \rightarrow \pi \pi Y(1S)$ with a significance of 6.2 standard deviations.

We present a study of the decay $Y(1S) \rightarrow D^{++} X$ produced in the decay $Y(2S) \rightarrow \pi^+ \pi^- Y(1S)$ using a sample of 98.6 million $Y(2S)$ events. We measure the $Y(1S) \rightarrow D^{++} X$ branching fraction and the momentum distribution of the D in the $Y(1S)$ rest-frame. We find evidence for an excess of D production over the expected rate from the virtual photon annihilation process $Y(1S) \rightarrow \gamma \rightarrow c\bar{c} \rightarrow D^{++} X$. We also present a search for the spin singlet h_b partner of the $\chi_b(1P)$ triplet, the $h_b(1P)$ state of bottomonium in the transition $Y(1S) \rightarrow \pi^0 h_b$ and $Y(3S) \rightarrow \pi^+ \pi^- h_b$ using a sample of 122 million $Y(3S)$ events.

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